REMARKS

The specification has been amended to reflect the 371 status. In addition, claim 5 has been amended so as to be divided into two separate claims, i.e. claim 5 is amended and claim 13. New claims 14-17 correspond to original claims 6-9, respectively.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "Version with markings to show changes made".

Favorable action on the merits is solicited.

Respectfully submitted,

Hiroaki INOUE et al.

Βv

Warren M. Cheek, Jr.

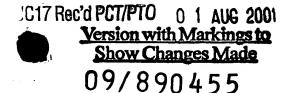
Registration No. 33,367 Attorney for Applicants

WMC/dlk Washington, D.C. 20006-1021 Telephone (202) 721-8200 Facsimile (202) 721-8250 August 1, 2001 10

20

25

@3/PRts



DESCRIPTION

ELECTROLESS PLATING LIQUID AND METHOD OF FORMING INTERCONNECTION USING SUCH AN ELECTROLESS PLATING LIQUID

5 Technical Field

The present invention relates to an electroless plating liquid and a method of forming an interconnection such an electroless plating liquid, particularly to an electroless plating liquid for filling interconnection recesses defined in a semiconductor substrate with an interconnection forming metal such as copper, its alloy, or the like, and a method of forming an interconnection using such an electroless plating liquid.

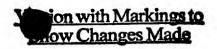
15 Background Art

forming For interconnection circuits on semiconductor substrates, it has heretofore been customary to grow an aluminum or aluminum alloy film on a substrate surface according to sputtering or the like, and then remove unwanted portions from the film according to chemical dry etching using a pattern mask such as a resist. However, as the level of circuit integration increases, the width of interconnections decreases and the current density in the interconnections increases, causing thermal stresses and temperature rises. Therefore, the interconnections liable to break due to stress migration or electromigration.

Copper which is lower in resistance and higher in reliability than aluminum or aluminum alloy has been drawing

10

15



concentration ranging from 0.01 to 10.0 g/L, said_EDTA 4H has a concentration ranging from 0.5 to 100 g/L, said glyoxylic acid has a concentration ranging from 1 through 50 g/L, and the electroless copper plating liquid has a pH adjusted to a range from 10 to 14 by said TMAH.

(Amended

A method of forming a copper interconnection on a semiconductor device, characterized by the steps of forming an auxiliary seed layer for reinforcing a copper seed layer in an interconnection groove defined in a surface of the semiconductor device using an electroless copper plating liquid containing dihydric copper ions, a complexing agent, an aldehyde acid, and an organic alkali, performing an electrolytic plating process using the seed layer including said auxiliary seed layer as a current feeding layer, for thereby filling copper in the interconnection groove defined in the surface the semiconductor device.

6. A method of forming a copper interconnection according to claim 5, characterized by performing an electroless copper plating process at a plating rate of 50 nm/min. or less using said electroless copper plating liquid.

25

7. A method of forming a copper interconnection according to claim 5, characterized in that said electroless copper plating liquid contains polyoxyethylene